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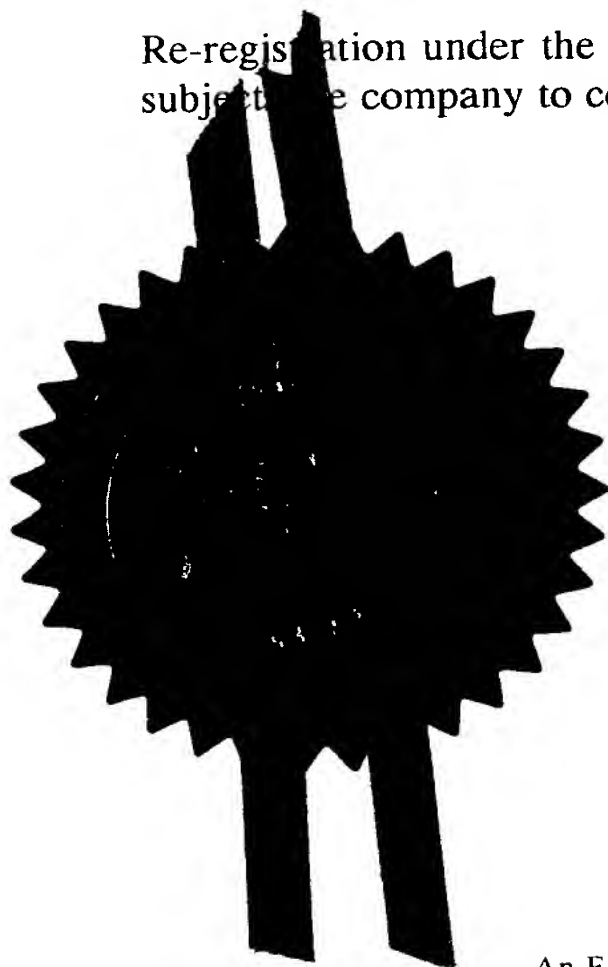
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# Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

3 DEC 1998

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1. Your reference

2. Patent

9826447.6

(The Patent Office will put in ...)

3 DEC 1998

3. Full name, address and postcode of the or of each applicant (underline all surnames)

RESEARCH SERVICES  
BRUNEL UNIVERSITY

UXBRIDGE, MIDDLESEX UB8 3PH UK

UXBRIDGE,

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

700969900

4. Title of the invention

FABRICATION OF A SEEDING LAYER,  
TO ENABLE ELECTROPLATING AND ELECTROLESS  
PLATING, VIA A LITHOGRAPHIC PRINTING PROCESS

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom  
to which all correspondence should be sent  
(including the postcode)

Patents ADP number (if you know it)

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)

Date of filing  
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7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

- a) any applicant named in part 3 is not an inventor, or
  - b) there is an inventor who is not named as an applicant, or
  - c) any named applicant is a corporate body.
- See note (d))

YES

# Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form

Description

Claim(s)

Abstract

Drawing(s)

2-39

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature

Date

1.12.98

12. Name and daytime telephone number of person to contact in the United Kingdom

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Title:

**Fabrication of a seeding layer to enable electroplating and electroless plating of predetermined artwork via a lithographic printing process.**

Inventors:

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**ABSTRACT**

The fabrication of lithographically printed artwork which can be utilized as an electrode or seeding layer for electroplating or electroless plating processes using a variety of suitable metals, including silver copper and tin. The seeding layer being formed by a composition of a range of materials which form lithographic inks, which include conductive material and an organic phase comprised of a resin, solvent and additives to make a paste like composition.

**BACKGROUND OF THE INVENTION**

It must be noted that the term "Lithographic process" referred to herein is a process for the printing of a seeding layer film on a suitable substrate, not, as is commonly used, a process involving photoresist and etching occurring during the production of etched circuit boards and micro electronics.

Electroplating is the coating of an object or part of, through electrolytic deposition. In order to electroplate, the object has to form an electrode which exhibits suitable geometry and electrical and chemical characteristics.

Electroless plating is the coating of an object, or part of, through chemical reduction process, which once initiated is auto catalytic. The process is similar to electroplating except no external current is necessary. In order to electroless plate, the object has to form a seeding layer of suitable geometry and electrical and chemical characteristics, on which the metal will be deposited.

Heretofore known processes and materials for the manufacture of electrodes and seeding layers apply to prior known methods of fabrication, for example; screen printing, not to the lithographic process, or lithographic ink, or substrate material used to create lithographically deposited electrodes or seeding layers.

One example application is in the manufacture of electronic circuit boards. The lithographically deposited seeding layer is printed in the graphical configuration of an electrical or electronic circuit. The seeding layer can then be electrolessly plated with copper and a further layer of tin or other protective layer. These layers improve the conductivity of the circuit tracks and allow them to be soldered directly onto via existing solder technologies.

A further example application is the manufacture of specialized abrasives where the electrode or seeding layer forms a base on which further layers of metals such as nickel can be deposited and grown around abrasive particles to anchor them.

The lithographic process of production of electrodes and seeding layers offers advantages of speed of production, and very fine track and gap width resolution.

**SUMMARY OF THE INVENTION**

The present invention relates to a fabrication process and material for the construction of artwork which may be employed as an electrode of an electroplating process or as the seeding layer of an electroless plating process. More particularly the subject invention relates to a process and material for the fabrication of lithographically printed films suitable for further manufacturing processes which may deposit through electrical or chemical means a thickness of conductive material onto the lithographically deposited films such as a conducting element.

The present invention relates to a method of lithographically printing electrodes and seeding layers on to a suitable substrate materials. The electrodes and seeding layers are formed by films of electrically conducting particles and a binder for retaining the conductive particles in an oriented relation.

#### DESCRIPTION OF THE INVENTION

For the fabrication of electrodes and seeding layers utilizing a lithographic printing process, a variety of materials are necessary to form a lithographically printable ink which exhibits suitable chemical and electrical characteristics. Suitable materials may be, selected for their electrical and chemical characteristics. For example a blend of silver flake may be used to provide the desired conductivity and chemical reactivity. Other suitable materials include silver powder, silver coated particles, gold, copper, zinc, nickel, and other suitably conductive and reactive materials. The subject invention includes an organic phase as a binder mixed with the aforementioned material. Suitable constituents of the organic phase include a resin such as an alkyd resin, phenolic resin, hydrocarbon resin, turpene resin and rosin, suitable hydrocarbon solvents and other suitable additives used to adjust the printing and drying properties of the printed layer.

As mentioned hereinabove, the electrodes and seeding layers are formed by processes and materials that are distinctly different from prior art, electrode and seed layers.

Still another feature of the subject invention provides for the printing of the components on a variety of substrates, including cellulose or synthetic polymer based paper, plastics and composites currently used in the electronics industry for example, FR4 or FR2. Additives to enhance selected characteristics are added to the composition, insuring that the components will be retained on the substrate to which they are applied. The type of material from which the substrate would be selected would depend on the function and manner of use of the plated object, and the environment in which it would be used.

In the mixing of the printed material that comprises the composition of the subject invention, relative percentages of the materials described above and that are used in the composition are as follows.

Material	Percent by weight
particulate phase	20 - 90
Organic phase	80 - 10